The Office of Environment, Safety and Health and its Office of Nuclear and Facility Safety (NFS) publishes the Operating Experience Weekly Summary to promote safety throughout the Department of Energy (DOE) complex by encouraging feedback of operating experience and encouraging the exchange of information among DOE nuclear facilities.

The Weekly Summary should be processed as an external source of lessons-learned information as described in DOE-STD-7501-96, *Development of DOE Lessons Learned Programs*.

To issue the Weekly Summary in a timely manner, the Office of Operating Experience Analysis and Feedback (OEAF) relies on preliminary information such as daily operations reports, notification reports, and, time permitting, conversations with cognizant facility or DOE field office staff. If you have additional pertinent information or identify inaccurate statements in the summary, please bring this to the attention of Dick Trevillian, 301-903-3074, or Internet address dick.trevillian@hq.doe.gov, so we may issue a correction.

Readers are cautioned that review of the Weekly Summary should not be a substitute for a thorough review of the interim and final occurrence reports.

Operating Experience Weekly Summary 97-11

March 7 through March 13, 1997

Table of Contents

EVENTS 1

1. INADVERTENT LIFTING OF FUEL CASK INSERT CAUSES UNREVIEWED SAFETY QUESTION 1

2. SAFETY DEFICIENCY RESULTS IN POTENTIAL EMPLOYEE EXPOSURE TO X-RAYS 2

3. CONTAMINATED WATER RELEASED WHILE FILLING TANK WITH GROUT 4

4. WORKER VIOLATES CONFINED SPACE WORK PERMIT 6

5. WORKER STRIKES ENERGIZED ELECTRICAL CABLE WHILE DRILLING IN CONCRETE 8

OEAF FOLLOW UP ACTIVITY 10

1. UPDATE ON FATALITY AT OAK RIDGE 10

Visit Our Web Site

The Weekly Summary is available, with word search capability, via the Internet at **http://www.tis.eh.doe.gov/web/oeaf/oe_weekly/oe_weekly.html**. If you have difficulty accessing the Weekly Summary at this URL, please contact Mark Mortensen at 208-525-3753 for assistance.

EVENTS

1. UNREVIEWED SAFETY QUESTION WITH FUEL HANDLING

On March 5, 1997, at the Idaho Chemical Processing Plant's Fuel Storage Area, fuel handlers unloading the Advanced Test Reactor (ATR) cask inadvertently removed the cask insert and several fuel elements, causing an unreviewed safety question. When one of the fuel elements was lifted and about to clear the top of the cask, a fuel-handling supervisor noticed the cask insert had also been lifted. Operators immediately stopped the lift. Operators re-packaged the element in a fuel storage bucket. The accidental removal of the cask insert caused an unanalyzed condition and an unreviewed safety question. (ORPS Report ID--LITC-FUELRCSTR-1997-0002)

The capacity of the ATR cask insert is eight fuel elements. During this operation, the insert contained seven fuel elements. The cask insert forms an annulus at the circumference of the cask cavity and is divided into eight segments by neutron-absorbing fins. The geometry of the fuel loading pattern in the cask and the poison in the fins ensures the contents of the cask are subcritical. The minimum number of ATR fuel elements needed for criticality is seven.

Investigators believe that, when the fuel handlers lifted the fuel element, it engaged a bent fin on the insert, causing the insert to be lifted along with the fuel. Engineers conducted an unreviewed safety question screening. The screening was positive because the potential to remove more than one fuel element from the cask at one time has not been analyzed. ATR fuel-handling activities are suspended until a recovery plan is developed and approved by DOE.

NFS reported fuel-handling events in Weekly Summaries 96-50, 94-38, and 94-35.

- Weekly Summary 94-35 reported that on August 25, 1994, operators at the Experimental Breeder Reactor II were moving a fuel unloading machine when they noticed the movement of a still-connected exhaust purge line and stopped all movement. Procedures require that all purge piping connections be removed from the fuel unloading machine before it is moved. Neither the piping nor the hose failed, and there was no leakage of radioactive gas. (ORPS Report CH-AA-ANLW-EBR-1994-0007)

Operating Experience Analysis and Feedback (OEAF) engineers reviewed the Occurrence Reporting and Processing System (ORPS) database for unreviewed safety questions across the DOE complex and found 440 occurrence reports. Figure 1-1 shows the number of unreviewed safety questions across the DOE complex by quarter.

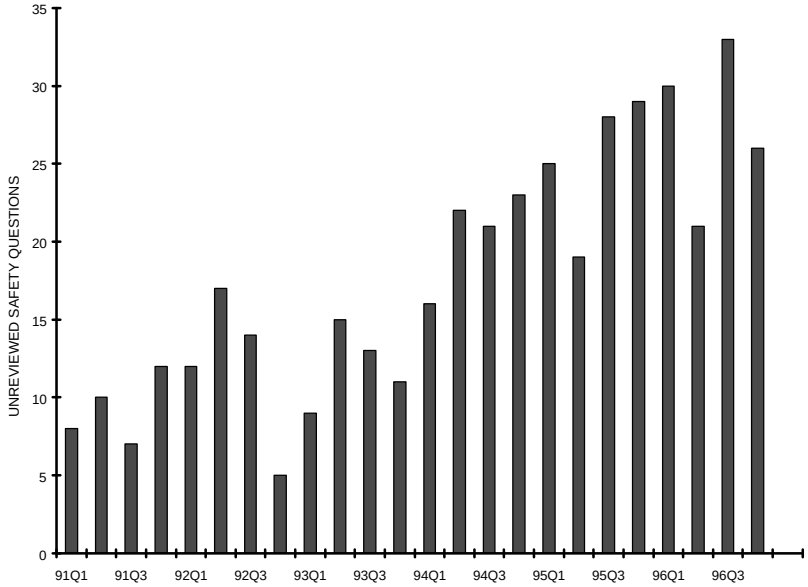


Figure 1-1. Unreviewed Safety Questions[1]

DOE 5480.21, *Unreviewed Safety Questions*, states that when a potential inadequacy of any part of the authorization basis of a facility is discovered, it may be necessary to perform a safety analysis to determine conclusively whether a safety problem exists. However, DOE requires immediate completion of an unreviewed safety question determination to provide a benchmark for the relative safety significance. DOE also requires the facility to be put in a safe condition. DOE 5480.21 requires integrating the unreviewed safety question process in all technical aspects of the responsible contractor organization, including design, engineering, maintenance, inspection, operations, and assessment. Workers at DOE facilities should be familiar with the requirements of the Order and should be able to identify potential unreviewed safety questions during the course of their normal work.

KEYWORDS: authorization basis, unreviewed safety question

FUNCTIONAL AREAS: compliance, licensing

2. SAFETY DEFICIENCY RESULTS IN POTENTIAL EMPLOYEE EXPOSURE TO X-RAYS

On February 21, 1997, at the Lawrence Berkeley National Laboratory, a group leader suspected that a potential safety deficiency existed on a beamline of the Advanced Light Source synchrotron. Further investigation revealed that this deficiency could expose personnel to low-energy scattered x-ray radiation. The group leader immediately locked out the beamline. On February 28, 1997, the group leader further determined that an engineering support employee was potentially exposed to x-rays while working at the beamline end station. The operations manager convened an internal review of the event. The review concluded that a June 26, 1996, beamline design review failed to recognize

[1] OEAF engineers screened the ORPS database for All Narrative “unreviewed safety question” and found 440 occurrence reports.

the significance of a design change to the end station. Inadequate safety reviews of equipment changes can significantly affect personnel safety. (ORPS Report SAN--LBL-AFRD-1997-0001)

Preliminary estimates indicate that the dose received by the engineering support employee was less than 100 mrem, the same order of magnitude as the dose from a medical x-ray. No other employee received any exposure above their expected occupational dose.

The operations manager conducted an internal review and determined the end station design changed as the concept evolved from the initial conceptual review to the detailed design review. The original concept envisioned two compartments, isolated from each other during personnel access; the final plans provided for only one compartment. The second design did not prevent scattered x-ray radiation from being present when experimenters removed an access panel. Design reviewers failed to recognize the safety significance of these changes. When operators tested the end station as part of the beamline review process, they conducted radiation surveys with the access panel in place. Based on the internal review, the operations manager determined the engineering support employee was testing the computer-controlled operation of the end station with the access panel removed during beam operation. The operations manager established a process improvement team to recommend improvements to the beamline review process. Subject matter experts at Brookhaven National Laboratory are also reviewing their beamline design guidelines for weaknesses.

NFS reported events involving inadequate design reviews in Weekly Summaries 95-27, 95-19, 94-11, and 94-09.

- Weekly Summary 95-19 reported on March 17, 1995, at the Brookhaven National Laboratory's Alternating Gradient Synchrotron Facility, radioactive contamination was released when a beam target broke during a high-intensity experiment. Four experimenters received internal exposures. Investigators determined the design review associated with the experiment was inadequate. Engineers had not considered the contamination consequences of a target failure. (ORPS Final Report CH-BH-BNL-AGS-1995-0002)

- Weekly Summary 94-11 reported on March 10, 1994, at the Savannah River Site, the removal of a barrier wall caused an air reversal in a building that allowed air flow from a radiological control area to a control room and offices. The air reversal could have resulted in radiological contamination of occupied work spaces. Investigators determined that engineers should have identified the impact removing the wall had on ventilation system operation during their design review process. (ORPS Report SR--WSRC-HCAN-1994-0033)

This event underscores the importance of engineers and system experts conducting thorough and adequate reviews of proposed designs and revisions. Attention must be paid to engineered safety features that can affect personnel safety at each stage in the review process. Design changes that can affect physical barriers (combining two isolated compartments into one compartment in this case) must be carefully examined. The *Hazard and Barrier Analysis Guide*, developed by the Office of Operating Experience Analysis and Feedback (OEAF), includes a hazard-barrier matrix that shows that physical barriers are among the most effective types of barriers for protection against ionizing radiation. The effectiveness of a barrier is related to how suitable or how comprehensive it is in protecting against a particular hazard. The reliability of a barrier is its ability to resist failure. Brookhaven National Laboratory's review of their beamline design

guidelines will help Lawrence Berkeley and Brookhaven Laboratories to develop uniform standards for similar potential hazards.

DOE 4330.4A, *Maintenance Management Program*, specifies a safety review for modifications before implementation; in part, to determine the effect of the modification on equipment safety and reliability. DOE 6430.1A, *General Design Criteria,* specification 0110-5.2, directs evaluating DOE facilities for potential risks to operators. Engineering designs must assure quality of equipment to maintain personnel safety. This includes analysis of effects of changes during the design and fabrication of equipment.

KEYWORDS: design, safety hazard, x-ray, exposure

FUNCTIONAL AREAS: radiation protection

3. CONTAMINATED WATER RELEASED WHILE FILLING TANK WITH GROUT

On March 3, 1997, at the Savannah River Site, 25 to 30 gallons of grout water contaminated with plutonium-238 and curium-243 overflowed from the risers of a tank onto the ground. A subcontractor was filling the tank with grout as part of a Resource Conservation and Recovery Act (RCRA) tank closure. Investigators determined that the subcontractor did not follow procedures for checking excess water in the tank and did not effectively plan the grout-filling process. Radiological control technicians verified contamination levels in excess of 5 million dpm alpha and 300,000 dpm beta-gamma on the ground at three tank risers. The subcontractor used absorbent pillows to soak up the spill. No one was contaminated as a result of this event. Failure to follow procedures and poor planning resulted in the spread of contamination. (ORPS Report SR--WSRC-SLDHZD-1997-0005)

The tank was the seventh of eight in-ground tanks to be abandoned in place. Eight weeks earlier, the subcontractor filled this tank 90 percent full of grout. The spill occurred while the subcontractor was filling the final 10 percent. The subcontractor's workers wore anti-contamination clothing and respirators. A high-efficiency particulate air filter was attached to a tank vent. A worker controlled the speed of a pump that moved the grout from a truck, through a boom, to the tank. Another worker observed the tank fill and inspected the levels in the four risers when pumping to the tank. The workers did not expect to find water in the tank. When the grout water spilled out of the risers, the pump operator immediately stopped the pump, but residual grout in the boom continued to enter the tank. Because of the viscosity of the grout, it continued to seek its level inside the tank and displaced the water for 5 to 10 seconds.

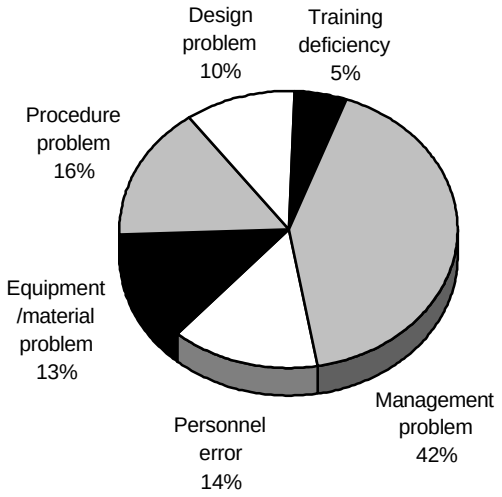
The subcontractor implemented contamination control measures by covering the area with plastic and securing it with sandbags. Follow-up control measures included adding another plastic covering and installing berms to redirect surface water. The facility manager is conducting an investigation to determine the cause of the spill.

Investigators determined the procedure required the subcontractor to check for the presence of excess water by inserting a rod into the tank to measure the depth of any water. The subcontractor did not use the rod and relied only on a visual inspection of the tank through the man-way. However, the amount of water on the surface of the grout could not be accurately determined by looking through the man-way. The subcontractor had spill kits at the tank site, but workers did not deploy the kits in anticipation of any spill

or overflow from the risers. Also, the subcontractor did not plan for the residual grout in the boom and the continued movement of grout in the tank when the pumping stopped. Investigators have not determined if the excess water was residual water from the tank cleanout or water that bled out of the initial grout.

NFS reported on tank overflow events in Weekly Summaries 96-52, 96-07, 96-04, 95-33, 95-27, 95-08, 94-25, 93-40, and 92-31. Weekly Summary 96-52 reported a control room operator at the Savannah River Site left the controls for an operating pump unattended while filling a tank, and low-level radioactive sludge overflowed onto a concrete slab. Investigators determined operator inattention caused the tank to overflow and resulted in the spread of contamination. (ORPS Report SR--WSRC-RMAT-1996-0009)

Operating Experience Analysis and Feedback (OEAF) Engineers reviewed the Occurrence Reporting and Processing System (ORPS) database for reports with a nature of occurrence code for radionuclide release. Figure 3-1 shows the distribution of root causes reported by facility managers for these events. Personnel error represented 14 percent of the root causes, and procedure problems accounted for 16 percent. Management problems represented 42 percent of the root causes. Inadequate administrative control accounted for 30 percent and work organization/planning deficiency accounted for 25 percent of the management problems.



Management Problem	Percent
Inadequate administrative control	30
Work organization/Planning deficiency	25
Other management problem	15
Policy not communicated or enforced	10
Improper resource allocation	10
Inadequate supervision	10

Figure 3-1. Distribution of Root Causes for Radionuclide Releases[1]

The process of grouting and sealing tanks to meet RCRA requirements for closure should be performed with great care. Tank geometry and capacities, including risers, should be verified to determine fill rates and volume of fill material required. Consideration should be given to hand-filling when levels are near tank capacity to prevent an unexpected overfill condition. If tanks previously contained contaminated or radioactive material, workers should treat any expelled gases, water, or fill material as contaminated.

[1] OEAF engineers screened the ORPS database for radionuclide release events using nature of occurrence code 02A and final reports and found 413 reports. A screen using an all narrative of "spill@" reduced the number to 77 reports. Based on a random sample of 38 reports, OEAF engineers determined that each pie slice is accurate within ± 2.6 percent.

This event is significant because failure to follow procedures resulted in the spread of contamination. This event could have been avoided by complying with procedure steps requiring a physical check for excess water in the tank. DOE 5480.19, *Conduct of Operations Requirements for DOE Facilities*, Attachment I, chapter XVI, provides guidelines and requirements for preparation, approval, changes, and use of operations procedures. Facility personnel should review this guidance, particularly as it relates to procedure compliance. The ORPS database indicates that failure to follow procedures is the cause of 30 percent of personnel errors,[1] and causes many significant and undesirable events.

KEYWORDS: tank, soil contamination, radiation protection, procedures

FUNCTIONAL AREAS: radiation protection, environmental protection, procedures

4. WORKER VIOLATES CONFINED SPACE WORK PERMIT

On March 6, 1997, at the Savannah River Site, a subcontract worker violated a confined space work permit (procedure) by working in a confined space without continuous air monitoring or signing the permit. The worker was removing contaminated sludge from a tank using a vacuum pump. The oncoming confined space attendant notified the on-shift health-protection worker and the shift supervisor. The shift supervisor suspended all potential confined space activities. Failure to follow procedures and the confined space permit subjected the subcontractor to unnecessary health risks. (ORPS Report SR--WSRC-RMAT-1997-0003)

Investigators determined that the other two procedures (the work clearance permit and the radiation work permit requirements) were met before the work started. They also determined the entry supervisor asked a radiological control operator to take the permit-required air sample to ensure there was negative air pressure inside the tank. The radiological control operator determined the air quality inside the tank was safe, but failed to maintain continuous air sampling. The worker put only her hands and arms inside the tank.

The subcontractor operations manager convened a critique to investigate the event. Critique members determined the direct cause was personnel error because the worker did not follow the confine space work permit. As a corrective action, management and operations contractor safety division staff will monitor subcontractor training classes to evaluate the adequacy of the subcontractor's confined space training. The subcontractor operations manager directed subcontractor trainers to retrain all subcontract workers on confined space work.

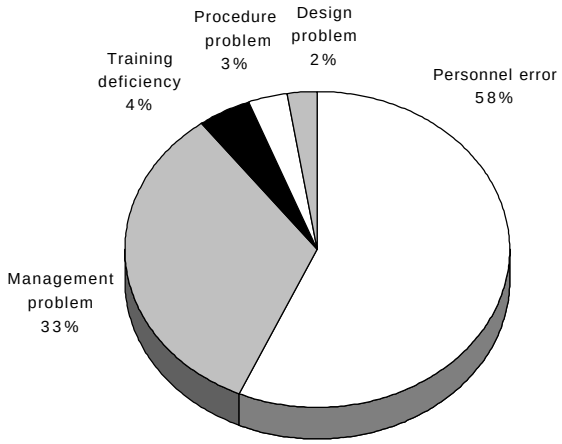
NFS reported events where procedures were not followed in Weekly Summaries 97-02, 96-48, 96-47, 96-38, 96-35, 96-19, and 96-08.

- Weekly Summary 97-02 reported on December 31, 1996, at Hanford, the Plutonium Finishing Plant facility manager reported criticality safety violations because material was not stored and handled in accordance with procedures. (ORPS Report RL--PHMC-PFP-1996-0015)

[1] OEAF engineers searched the ORPS database for all root causes coded as 3 (personnel errors) DOE-wide through 02/28/97. The total number of reports was 6,476. Procedure not used or used incorrectly accounted for 1974 of the reports.

- Weekly Summary 96-38 reported that on September 6, 1996, a facility manager at the Sandia National Laboratories reported that a subcontractor entered a confined space without calibrated, inspected monitoring equipment; without an attendant; and without a posted confined space permit. (ORPS Report ALO- KO-SNL-CASITE-1996-0009)

Operating Experience Analysis and Feedback (OEAF) engineers reviewed the Occurrence Reporting and Processing System (ORPS) database for a 1-year period for events with procedure not used or used incorrectly as the direct cause and found 405 occurrence reports. Figure 4-1 shows that facility managers reported personnel errors as the root cause for 58 percent of the reports and management problems for 33 percent of the reports across the DOE complex. Further review shows that 63 percent of the personnel errors were reported as workers not using the procedure or using it incorrectly.



Personnel Error	Percent
Procedure not used or used incorrectly	63
Inattention to detail	29
Communication problem	4
Other human error	4

Figure 4-1. Distribution of Root Causes for Procedures Not Used[1]

Contractors and subcontractors must coordinate entry operations to ensure hazards are identified and precautions are taken to protect workers. OSHA 1910.146, *Permit-Required Confined Spaces*, contains requirements for practices and procedures to protect employees from the hazards of entry into permit-required confined spaces. Section (c)(7)(iv) defines contractor responsibilities, and section (c)(9) identifies subcontractor responsibilities. Construction managers and supervisors should review the OSHA regulation and their confined space program requirements; elements identified in the OSHA regulation should be incorporated into facility programs. Contractor employees must follow applicable regulations and their own safety plans to ensure worker safety. Testing of confined spaces before entry and continuous monitoring of the space as long as it is occupied are essential. Monitoring instruments must be reliable, accurate, and easy to use.

KEYWORDS: confined space, procedure

FUNCTIONAL AREAS: procedures, training and qualification

[1] OEAF engineers screened the ORPS database for Direct Cause "3B@" (procedure not used or used incorrectly) and all final reports from 03/01/96 through 03/01/97, and found 405 occurrence reports containing 411 occurrences.

5. WORKER DRILLS INTO ENERGIZED ELECTRICAL CABLE

On February 25, 1996, at Brookhaven National Laboratory, a subcontract worker struck an energized 120-volt electrical cable while drilling into a concrete floor. The worker saw sparks and immediately stopped work. He was not shocked or injured as a result of this incident, and there were no adverse effects on the facility or other personnel. The facility manager directed facility electricians to repair the circuit. Failure to identify buried conduit or power lines before drilling can cause personnel injury and damage equipment and can adversely affect facility operation. (ORPS Report CH-BH-BNL-PE-1997-0003)

Investigators determined the conduit was located in a building lobby area and supplied power to an outside light fixture. Investigators determined work planners did not identify the location of the cable before drilling started. They also determined that Brookhaven National Laboratory as-built drawings for buried electrical conduit runs did not show the exact locations of the conduits.

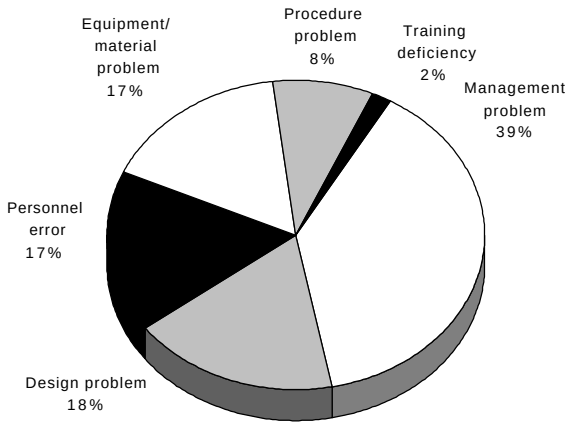
The safety, training, and quality group conducted a preliminary investigation of this event. As a corrective action, workers will use a sub-surface interface radar device to map potential drilling areas. Procedures are being developed to ensure the safety of drilling operations. In the interim, the safety, training, and quality group issued a Plant Engineering Bulletin stating that before workers drill deeper than 2 inches or operate jackhammers, they must contact the safety, training, and quality group for instructions.

NFS reported events where workers severed or contacted electrical conduits or cables while drilling or excavating in concrete in Weekly Summaries 96-37, 96-42, 96-31, 96-17, 96-08, 96-05, 96-04, and 95-39.

- Weekly Summary 96-04 reported an event on January 17, 1996, at Los Alamos National Laboratory, where a laborer was burned and rendered unconscious when he hit a 13.2-kV electrical power cable while excavating in a building basement. (ORPS Report ALO-LA-LANL-TSF-1996-0001 and Type A Accident Investigation Board Report on the January 17, 1996, Electrical Accident with Injury in Building 209, Technical Area 21, Los Alamos National Laboratory)

- Weekly Summary 95-39 reported an event on September 21, 1995, at Savannah River Site, where a shift technical engineer at the Laboratory Technical Area discovered an energized electrical conduit that had been punctured by construction excavators while they were jackhammering a trench in a concrete floor. They were not aware they had damaged a conduit. Investigators determined a contributing cause was that the excavators misinterpreted requirements for applying clearance zones around interference points when using ground-penetrating radar. They were unaware that the requirement applied to the vertical direction (meaning that the conduit could be between 4 and 28 inches deep and not exactly at the 16 inches indicated). (ORPS Report SR--WSRC-LTA-1995-0102)

Operating Experience Analysis and Feedback (OEAF) engineers reviewed the Occurrence Reporting and Processing System (ORPS) database and found 295 final reports associated with excavating and cutting or damaging underground electrical cables. Figure 5-1 shows facility managers reported management problems as the root cause for 39 percent of the events. Further review shows that 32 percent of the management problems were reported as inadequate administrative control problems.



Management Problem	Percent
Inadequate administrative control	32
Work organization/Planning deficiency	23
Policy not communicated or enforced	19
Other management problem	18
Inadequate supervision	6
Improper resource allocation	2

Figure 5-1. Distribution of Root Causes for Underground Cable Damage[1]

These events underscore the importance of using effective work control practices and detailed job planning to provide multiple levels of protection. Safety and health hazard analysis must be included in the work control process to help prevent worker injury. DOE 4330.4B, *Maintenance Management Program*, section 8.3.1, provides guidelines on work control systems and procedures. The Order states that work control procedures help personnel understand the necessary requirements and controls. Work control managers at DOE facilities should review their programs to ensure that engineers and craftsmen understand their responsibilities and obligations. DOE-STD-1050-93, *Guideline to Good Practices for Planning, Scheduling, and Coordination of Maintenance at DOE Nuclear Facilities*, provides information on work controls and work coordination. The OSHA safety requirements of 29 CFR 1926, *Safety and Health Regulations for Construction*, sub-parts .651(b) and .416(a)(3) assign employers responsibility for identifying underground hazards and energized circuits near the work. The requirements of 29 CFR 1926.965(c) state that work must be conducted in a manner to avoid damage to underground facilities. DOE facility managers should review contractor safety guidelines to ensure compliance with OSHA requirements.

NFS issued DOE/EH-0541, Safety Notice 96-06, "Underground Utilities Detection and Excavation," in December 1996. The notice provides descriptions of recent events, an overview of current technology for underground utility detection, specific recommendations for improving site utilities detection and excavation programs, and information on innovative practices used at DOE facilities. At Hanford, for example, an excavation coordinator is the single-point-of-contact for the excavation process. A central coordinator should not only assist in identifying underground utilities, but should record those findings and maintain records for future excavation activities. Safety Notice 96-06 can be obtained by contacting the Info Center, (301) 903-0449, or by writing to ES&H

[1] OEAF engineers screened the ORPS database for final reports and All Narrative for "underground or bur@; elect@; excav@ or dig@; cable or wire or conduit; cut@ or sever@ or damag@ and found 295 occurrence reports. A random sample of these reports and determined that each pie slice is accurate to within ± 3 percent.

Information Center, U.S. Department of Energy, EH-74, Suite 100, Century XXI, Third Floor, Germantown, MD 20874.

KEYWORDS: electrical safety, excavation, pre-job planning

FUNCTIONAL AREAS: work control, construction

OEAF FOLLOW UP ACTIVITY

1. UPDATE ON FATALITY AT OAK RIDGE

On March 7, 1997, Dr. Tara O'Toole, assistant secretary, Environment, Safety and Health, issued a memorandum outlining the Type A Accident Investigation Board's preliminary findings on the February 13, 1997, fatality at Oak Ridge K-25 site. The following is a summary of Dr. O'Toole's memorandum.

The fatality occurred while welders were using oxygen/acetylene cutting torches to remove equipment from a facility outside a fixed shop area in a high-contamination area. Because the work was being performed in a radiological area, the welders wore anti-contamination clothing in addition to full-face respirators and welders' masks. The Board's preliminary analysis of the accident indicated that sparks and/or molten metal (slag) from the cutting operations ignited the welder's anti-contamination clothing. Based on preliminary input, the Board identified the flammability of the anti-contamination clothing, the worker's inability to see that his clothing was on fire, and the lack of a designated/dedicated fire watch for the operations as contributing factors to the accident. The fire consumed the welder's clothing in a short period of time (approximately 3 minutes or less).

The welder wore anti-contamination clothing that was 100 percent cotton and not treated with flame retardant. Flame-retardant anti-contamination clothing is available to workers at some DOE sites. However, there are no regulatory, industrial, or DOE requirements stating such clothing must be used in operations similar to those being performed at the K-25 site when the accident occurred. Personnel safety responsibilities for the fire watch were not specifically defined or required for the welding operations. As a result, the memorandum recommends that operations office managers review the following personnel safety issues for work at their sites involving similar hazards.

- adequacy of fire watch procedures involving personnel safety as well as property loss control (e.g. maintaining line of sight)
- adequacy of fire watch training regarding personnel safety and emergency aid/response
- adequacy of fire mitigation equipment (for both personnel and property) available to fire watches to carry out their responsibilities
- adequacy of existing policy/requirements for using flame-retardant-treated anti-contamination clothing when workers are involved in operations with similar hazards

The Accident Investigation Board is continuing to investigate this event. Findings from the Board's final report will be disseminated in a future OE Weekly Summary.

KEYWORDS: welding, burn, fatality, anti-c clothing

FUNCTIONAL AREAS: industrial safety, radiation protection